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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,686	05/18/2006	Nobuhiro Kondo	SUZU1650	9588

44654   7590   11/12/2008
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EXAMINER
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ART UNIT	PAPER NUMBER
2628	

MAIL DATE	DELIVERY MODE
11/12/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *08 April 2008*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-17* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-17* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *08 April 2008* is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Specification

The lengthy specification has not been checked to the extent necessary to determine the

presence of all possible minor errors. Applicant's cooperation is requested in correcting any

errors of which applicant may become aware in the specification.

Drawings

1.   Color photographs and color drawings are not accepted unless a petition filed under 37

CFR 1.84(a)(2) is granted. Any such petition must be accompanied by the appropriate fee set

forth in 37 CFR 1.17(h), three sets of color drawings or color photographs, as appropriate, and,

unless already present, an amendment to include the following language as the first paragraph of

the brief description of the drawings section of the specification:

> The patent or application file contains at least one drawing executed in color. Copies of this patent or patent
> application publication with color drawing(s) will be provided by the Office upon request and payment of the
> necessary fee.

Color photographs will be accepted if the conditions for accepting color drawings and

black and white photographs have been satisfied. See 37 CFR 1.84(b)(2).

Claim Rejections - 35 USC § 101

1.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or
> any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and
> requirements of this title.

Claims 1-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim(s) 1-6 is/are rejected under 35 U.S.C. 101 as not falling within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory "process" under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing (Reference the May 15, 2008 memorandum issued by Deputy Commissioner for Patent Examining Policy, John J. Love, titled "Clarification of 'Processes' under 35 U.S.C. 101"). The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process.

Claims 7-12 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. That is, the claims are directed to a program product, where the claim as a whole is directed towards software. For example, in claim 7, the means are means for instructing a computer to perform operations by way of software codes (see page 14, lines 7-9 of the specification). When, the claimed components are software or program codes, the claim is essentially a data structure, per se. Data structures are descriptive material per se and are not statutory because they are not capable of causing functional change in the computer. Such claimed data structures do not define any structural and functional interrelationships between the

data structure and other claimed aspects of the invention which permit the data structure's

functionality to be realized.

Claim Rejections - 35 USC § 102

1.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2.   Claims 1, 3, 5-9, 11-13, 15, and 17 are rejected under 35 U.S.C. 102(e) as being

anticipated by Museth et al. (US Pub 2008/0074419).

As per claim 1, Museth teaches the claimed:

1. An image processing method using a computer, comprising:

extracting vertex coordinates of a triangular-shaped polygon *([0111], "This section describes an

algorithm for calculating a distance volume from a 3D closed, orientable <u>polygonal mesh</u>

<u>composed of</u> triangular faces, edges, <u>vertices</u>, and normals pointing outwards" where retrieving

or loading the vertices from memory for use in the distance calculations is extracting of vertex

coordinates)*;

setting a region surrounding the triangular-shaped polygon on the basis of the vertex coordinates

*([0056], "<u>defining the region of influence (ROI)</u>, i.e. the region where ( ) should be non-zero.

This is done by either the user interactively placing a 3D object around the region, <u>or by</u>*

automatically calculating a region from properties of the surface" where the surface properties

includes vertex coordinates);

measuring a distance from a lattice point included in the region to the triangular-shaped polygon

([0056], "The second step, step 48, consists of calculating a distance measure to the ROI

primitive"; [0058], "In Eq. (8a) d denotes the distance from a point on the level set surface to

the closest point in the point set p. In Eq. (8b) d denotes a signed distance measure from a point

on the level set surface to the implicit surface s"; lattice points are shown in figure 12); and

drawing a graphic figure on the basis of the distance from the lattice point to the triangular-

shaped polygon *([0195], "In this way, computer 1001 is able to display the results of the*

computation to a user in the form of output" and in the abstract, "For example, shortest distance

calculations, bounding boxes, numerical integration, and the sparse-field methods are disclosed

for the implementation of the level set deformation operator embodiments including blending,

smoothing sharpening, and embossing. The resulting level sets model can be volume rendered").

As per claim 3, Museth teaches the claimed:

3. The method according to claim 1, wherein the distance from the lattice point to the triangular-

shaped polygon is given as data which is accompanied with a sign indicative of whether the

lattice point is outside or inside the graphic figure drawn by the polygon *([0058], "In Eq. (8a) d*

denotes the distance from a point on the level set surface to the closest point in the point set p. In

Eq. (8b) d denotes a signed distance measure from a point on the level set surface to the implicit

surface s. The signed distance measure does not necessarily have to be Euclidean distance--just

a monotonic distance measure following the positive-inside/negative-outside convention").

As per claim 5, Museth teaches the claimed:

5. The method according to claim 1, further comprising: dividing a drawing region of the graphic

figure, which is drawn by the triangular-shaped polygon, into a plurality of meshes; and further

dividing the mesh, in which an outline of the graphic figure is present, into a plurality of meshes,

wherein said region is set for each of the meshes *([0179] "One of the most effective techniques*

for increasing interactivity in the present level set editing system involves restricting

computations to a subregion of the volume dataset" where determining subregions is dividing

the mesh; [0189] "Next, for each subsequent iteration of the level set calculation, new triangles

are only extracted from the sub-volume defined by the bounding box", for each bounding box,

the triangles contained in that box is a mesh, the plurality of bounding boxes creates a plurality

of meshes. In this case, the dividing of the graphic is on a graphic which is already drawn, see

figure 1, where drawing is performed in piece 32 and there is a feedback loop that returns

processing to the level set calculation in piece 26 even once rendering has been performed in

piece 32. an iterative level set calculation is being performed several times after the graphic

figure is already drawn in iterations; The reference also teaches of dividing in other instances:

[0180], "Employing bounding boxes within the local level set editing operators ... significantly

lessens the computation time during the editing process ... For the smoothing, sharpening and

embossing operators, the user specifies the portion of the model to be edited by positioning a

region-of-influence (ROI) primitive"; The outline is present due the subvolumes containing a

portion of the object's surface).

As per claim 6, Museth teaches the claimed:

6. The method according to claim 2, wherein a surface of the graphic figure is drawn by

transforming a parametric representation using the polygon to an implicit-function representation

(in the abstract, "The method involves <u>defining and forming a level set surface model</u>" and

[0012], "Level set models are <u>deformable implicit surfaces</u> where the deformation of the surface

is controlled by a speed function in the level set partial differential equation"; the

transformation is shown in figure 1).

As per claim 7, the reasons and rationale for the rejection of claim 1 is incorporated herein.

Museth teaches the claimed:

A computer program product for processing *([0201], "Application code may be embodied in any*

form of computer program product").

As per claims 9, 11, and 12, these claims are similar in scope to claims 3, 5, and 6, respectively,

and thus are rejected under the same rationale.

As per claim 13, the reasons and rationale for the rejection of claim 1 is incorporated herein.

Museth teaches the claimed:

An input unit configured to receive polygon data *(in the abstract, "One embodiment takes scan*

converts <u>*input models such as polygon mesh*</u>*, NURBS, CSGS models into level set models")*.

As per claims 15 and 17, these claims are similar in scope to claims 3 and 5, respectively, and

thus are rejected under the same rationale.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   Claims 2, 4, 8, 10, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Museth.

As per claim 2, Museth does not explicitly teach the claimed limitations, however suggests the

claimed features as follows:

2. The method according to claim 1, wherein the graphic figure is drawn as a set of points at

which the distance to the triangular-shaped polygon is zero *(in figure 10 and [0056], "The*

second step, step 48, consists of <u>*calculating a distance measure*</u> *to the ROI primitive. This is*

followed by step 50, which involves defining a function <u>*that smoothly approaches zero*</u> *at the*

boundary of the ROI" and [0058], "Note that .sub.p(d) is one when the shortest distance, d, to

the point set is smaller than d.sub.min, and decays smoothly to zero as d increases to d.sub.max, after which it is zero". The reference teaches of drawing in figure 1, step 32).

It would have been obvious to one of ordinary skill in the art at the time of invention to applying distance to the polygon as zero to all of the points in graphic figure in Museth in order to better represent complication surface shapes and more flexibility in handling the changes in topology.

As per claim 4, Museth does not explicitly teach the claimed limitations in their system, however Museth suggests the limitation in the background.

4. The method according to claim 1, further comprising converting all of a plurality of polygons that form the graphic figure into triangular-shaped polygons, prior to the step of extracting the vertex coordinates of the triangular-shaped polygon *(in figure 1, step 14, "3D Scan Conversion" where this is performed prior-to extracting because it is a preprocess in the figure, and in [0009] "3D scans can be converted to polygonal and parametric surface meshes. Many algorithms and systems for editing these polygonal and parametric surfaces have been developed" and [0111], "a 3D closed, orientable polygonal mesh composed of triangular faces, edges, vertices, and normals pointing outwards" where triangular faces result after pre-processing).*

It would have been obvious to one of ordinary skill in the art at the time of invention to apply the scan conversion in Museth in order to better handle scanned raw volume data by running a conversion algorithm on it to retrieve usable triangular mesh data for subsequent processing.

As per claims 8, 10, 14, and 16, these claims are similar in scope to claims 2, 4, 2, and 4,

respectively, and thus are rejected under the same rationale.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

see PTO form 892.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Daniel F. Hajnik whose telephone number is (571) 272-7642.

The examiner can normally be reached on Mon-Fri (8:30A-5:00P).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Ulka J. Chauhan can be reached on (571) 272-7782. The fax phone number for the

organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated

information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Daniel Hajnik/   /Ulka Chauhan/
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